US 20130037576A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2013/0037576 A1

(43) Pub. Date: Feb. 14, 2013

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(54) **FORMULA DISPENSER**

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(21) Appl. No.: **13/136,722**

(22) Filed: **Aug. 8, 2011**

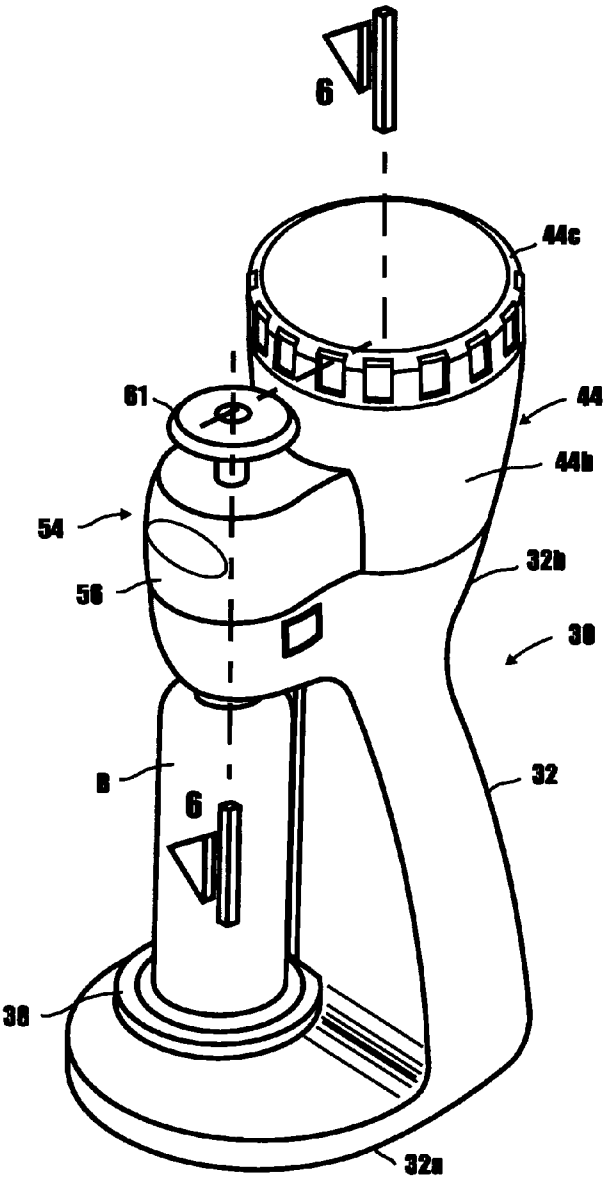
Publication Classification

(51) **Int. Cl.**
B65D 83/06 (2006.01)

(52) **U.S. Cl.** **222/321.1**

(57) **ABSTRACT**

An improved dispenser for dispensing metered amounts of powdered material, such as baby formula, from a powdered material container having a removable cap that can be quickly and easily interconnected with the dispenser. The dispenser can accommodate formula bottles of various sizes and includes a dispensing plunger that provides an oscillating action to prevent compaction of the formula and functions to ensure even dispensing of the formula into the formula bottle. Uniquely, the improved dispenser includes a strategically positioned vibration motor that controllably vibrates the powdered material container in a manner to also prevent compaction and clumping of the powdered material contained within the powdered material container.



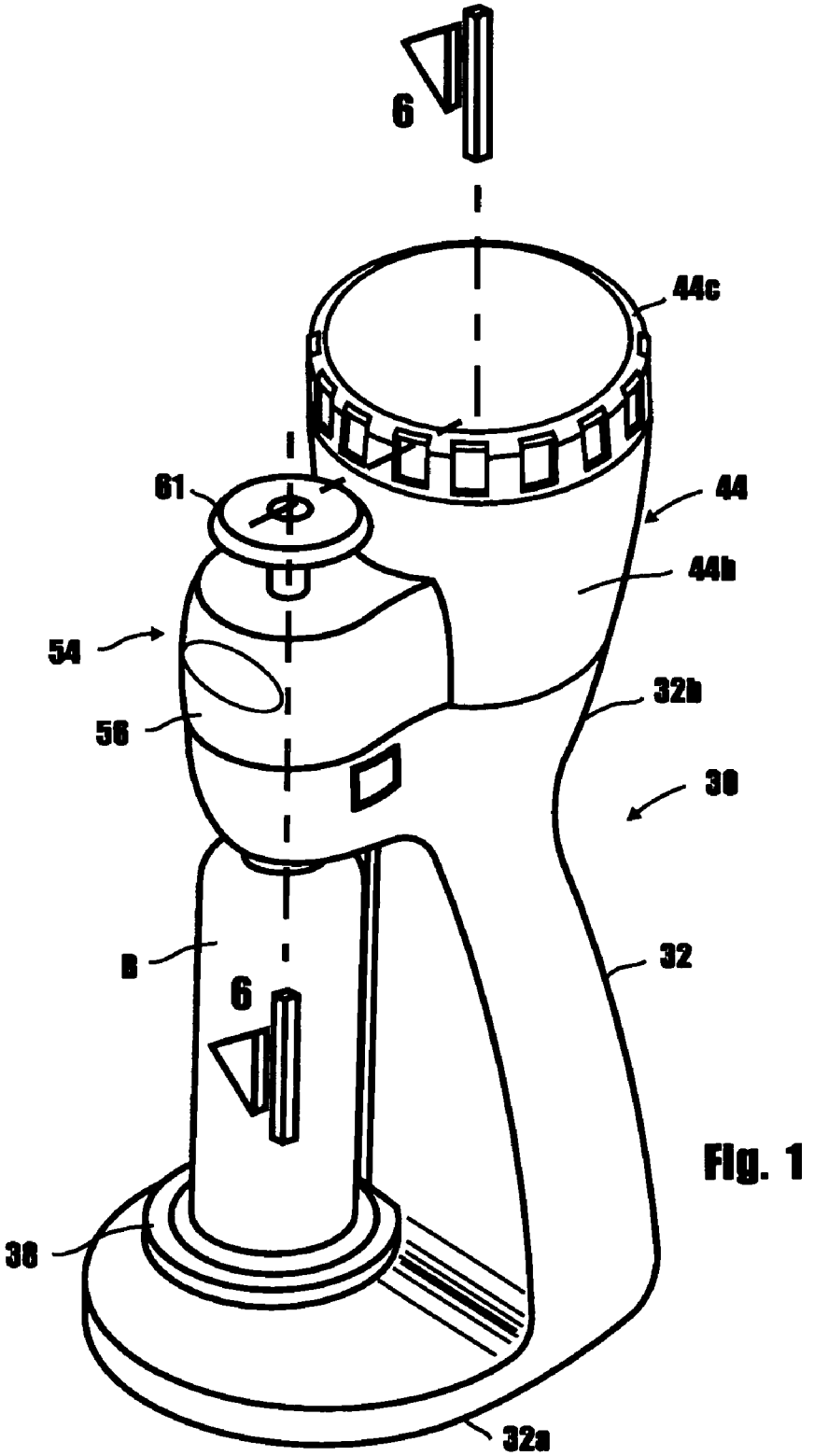


Fig. 1

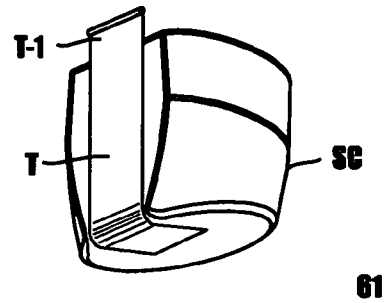


Fig. 3

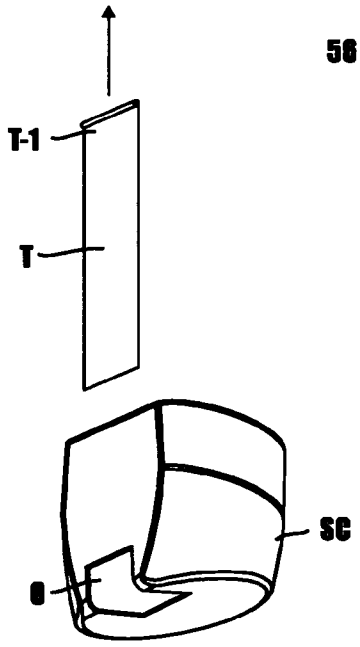


Fig. 3A

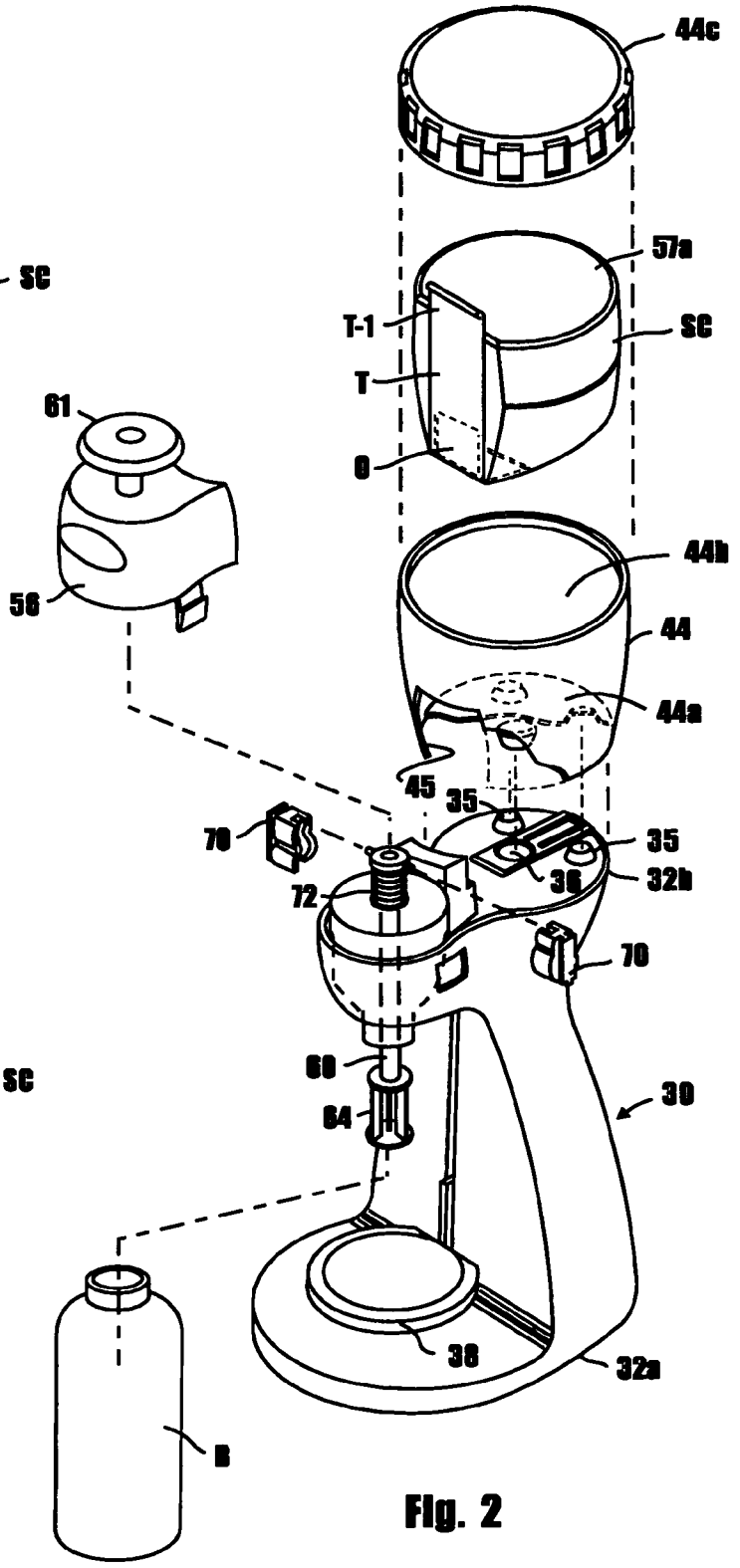


Fig. 2

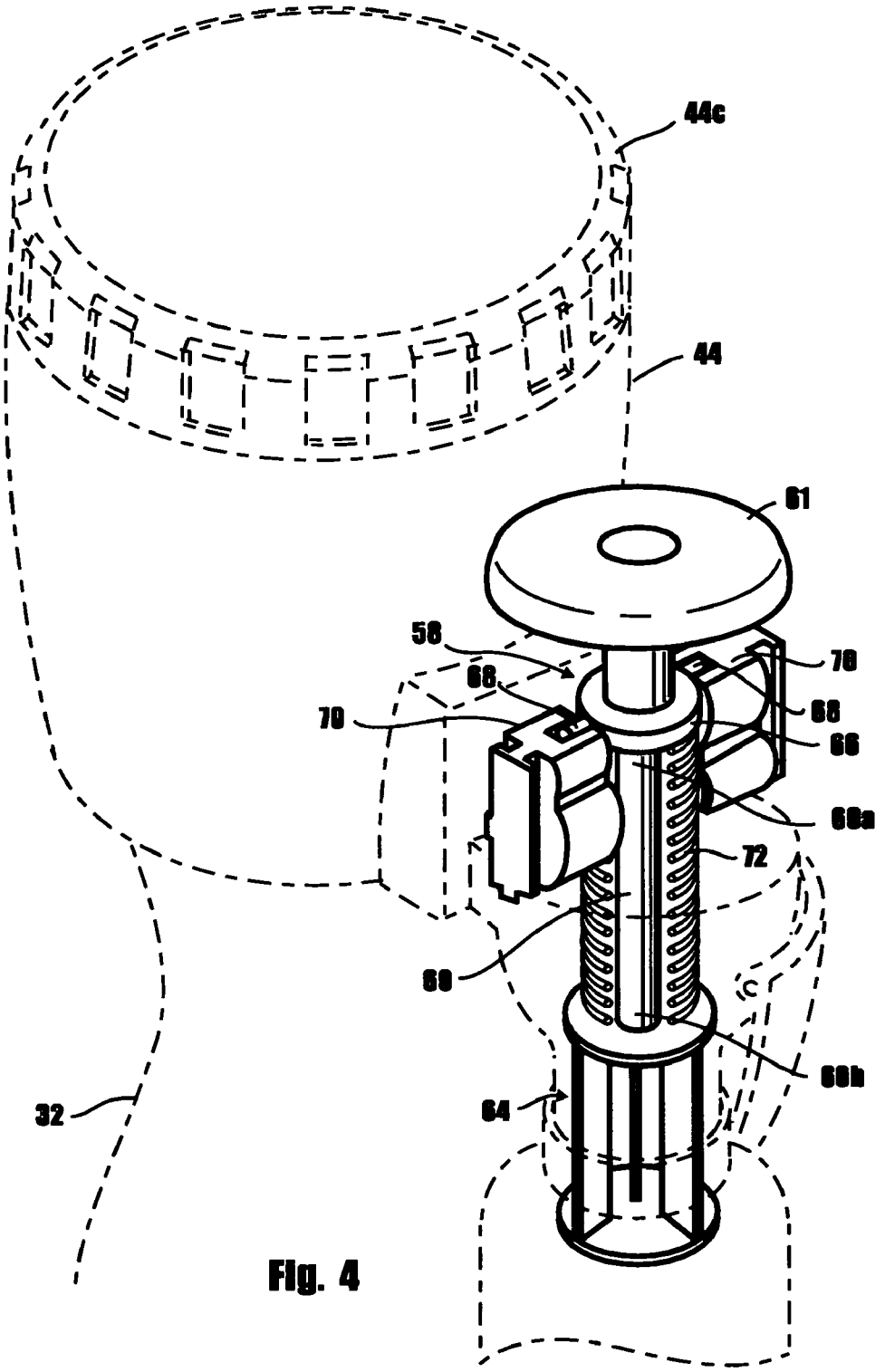


Fig. 4

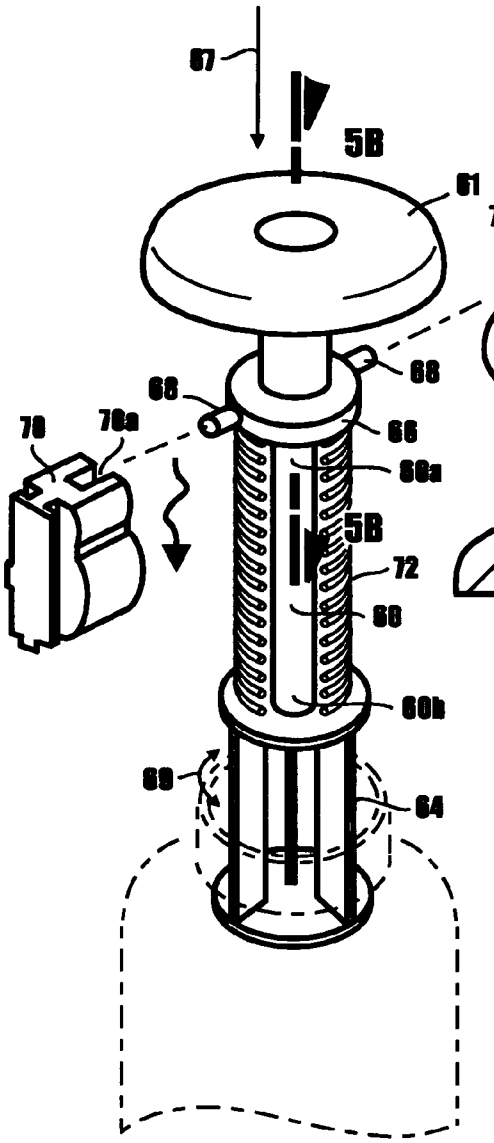

67
5B
61
70a
70
68
68
70
70a
66
60a
5B
72
68
60b
69
64

Fig. 5

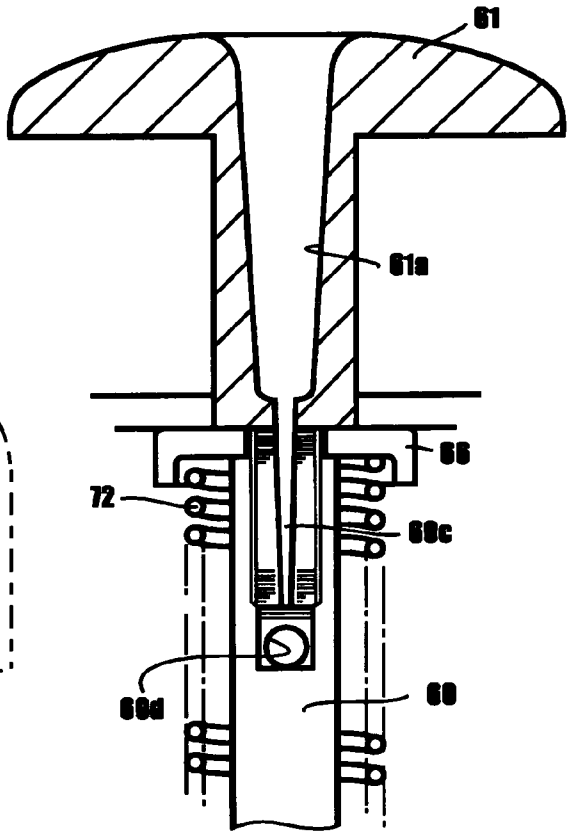

61
61a
66
72
60c
60d
60

Fig. 5B

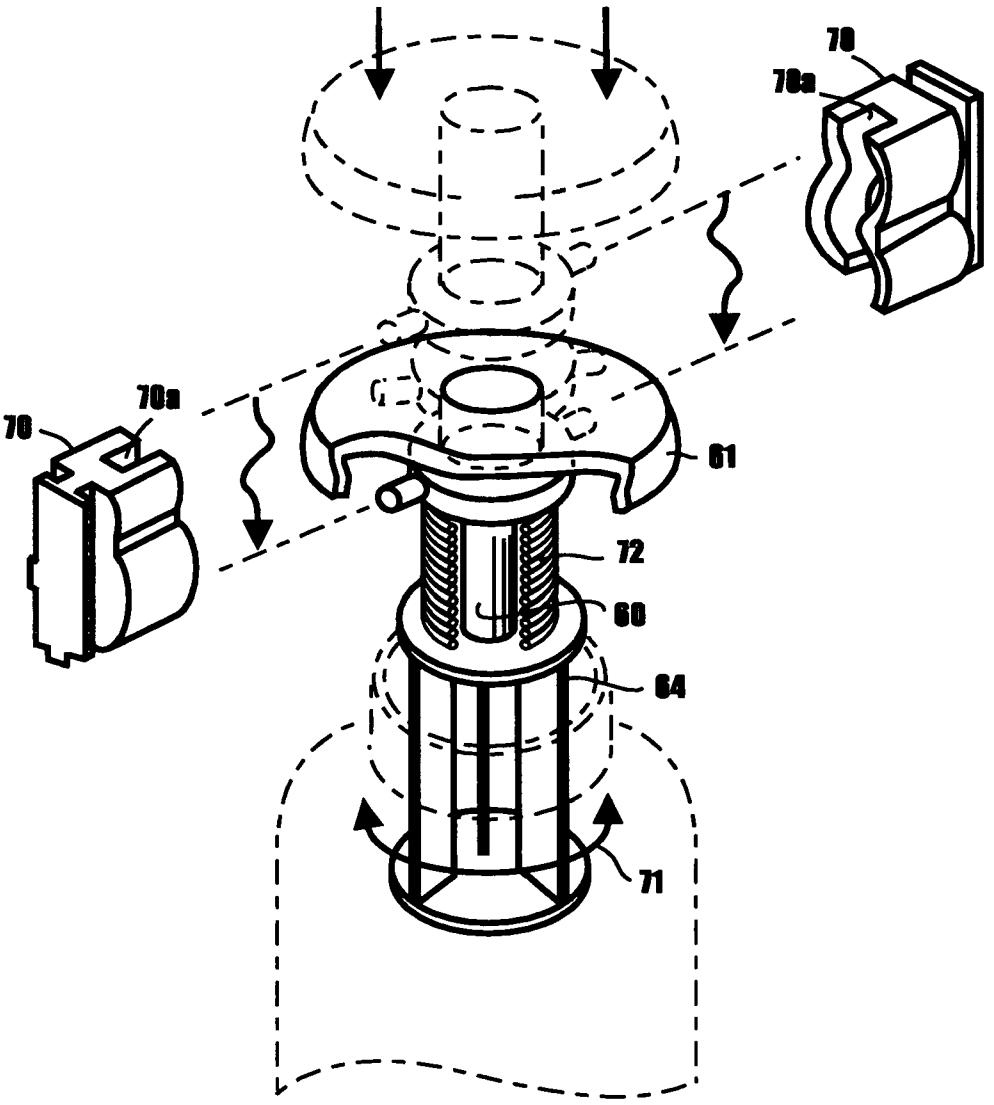


Fig. 5A

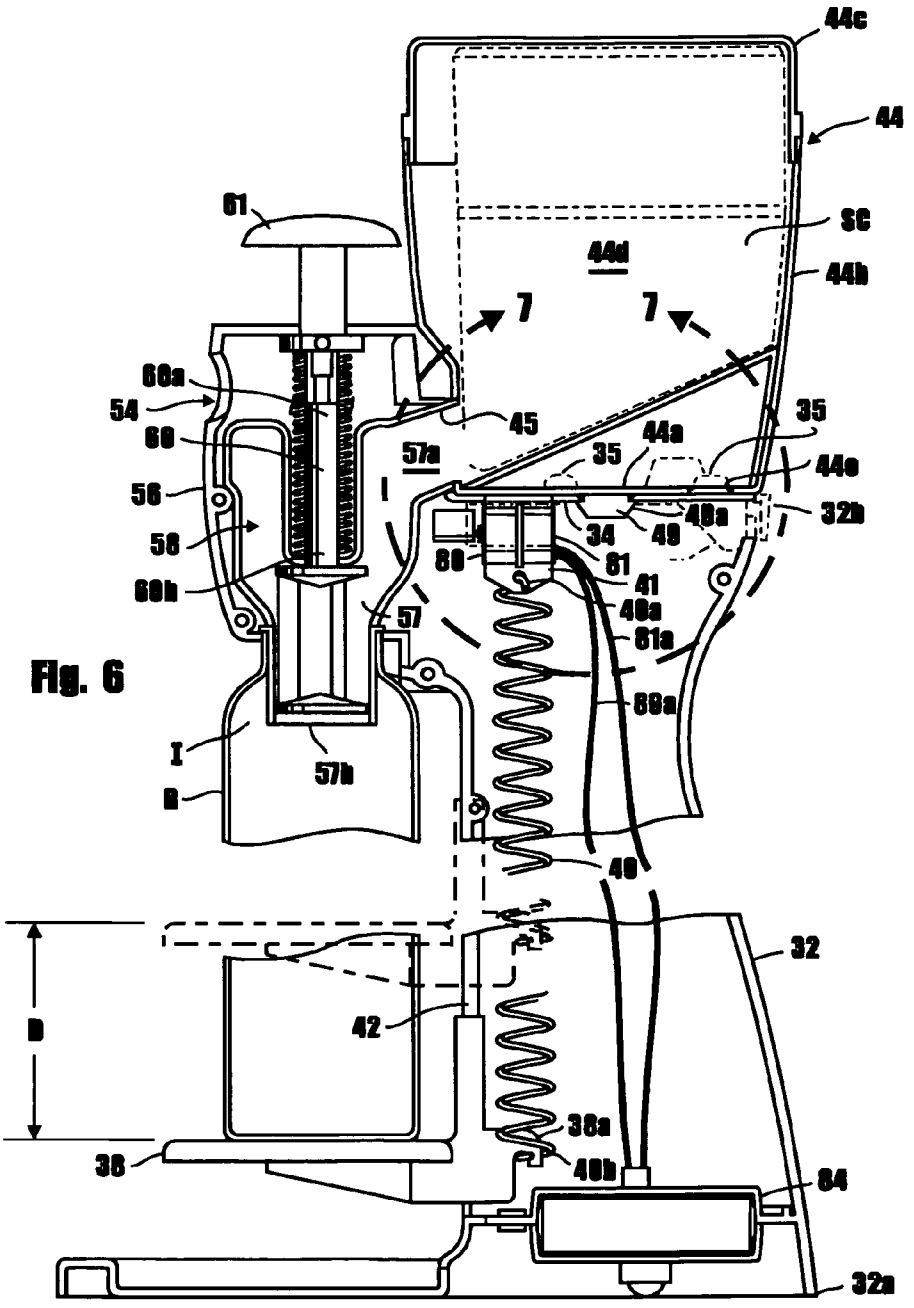

44c
44
61
SC
44d
44b
7
7
60a
54
60
45
35
44a
35
44e
57a
56
48a
32b
58
34
48
60b
61
41
57
48a
61a
69a
I
57b
B
48
32
D
42
38a
38
48b
84
32a

Fig. 6

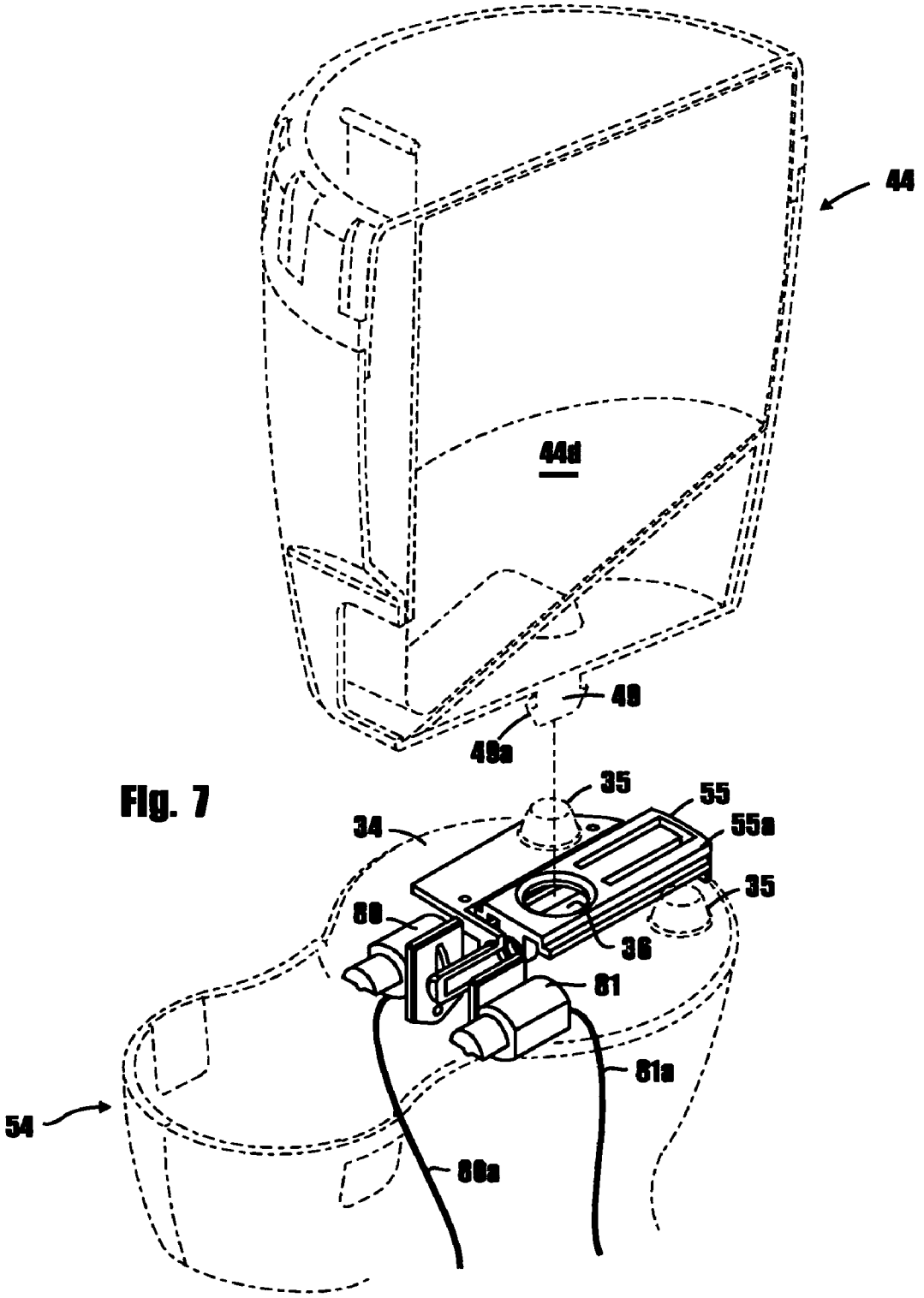


Fig. 7

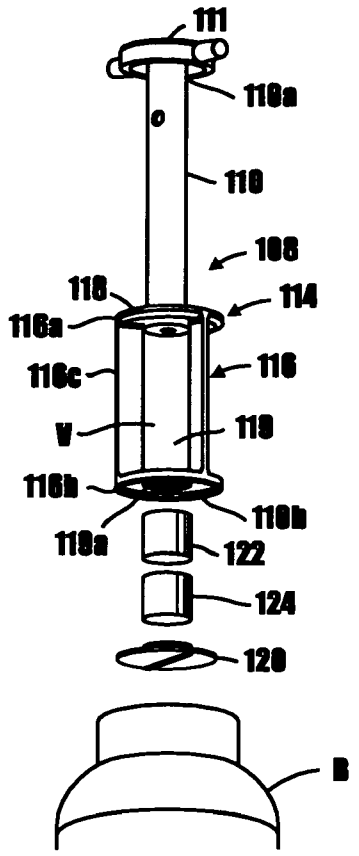

111
118a
o
110
108
118
114
116a
116c
116
V
119
116b
119b
119a
122
124
120
B

Fig. 8

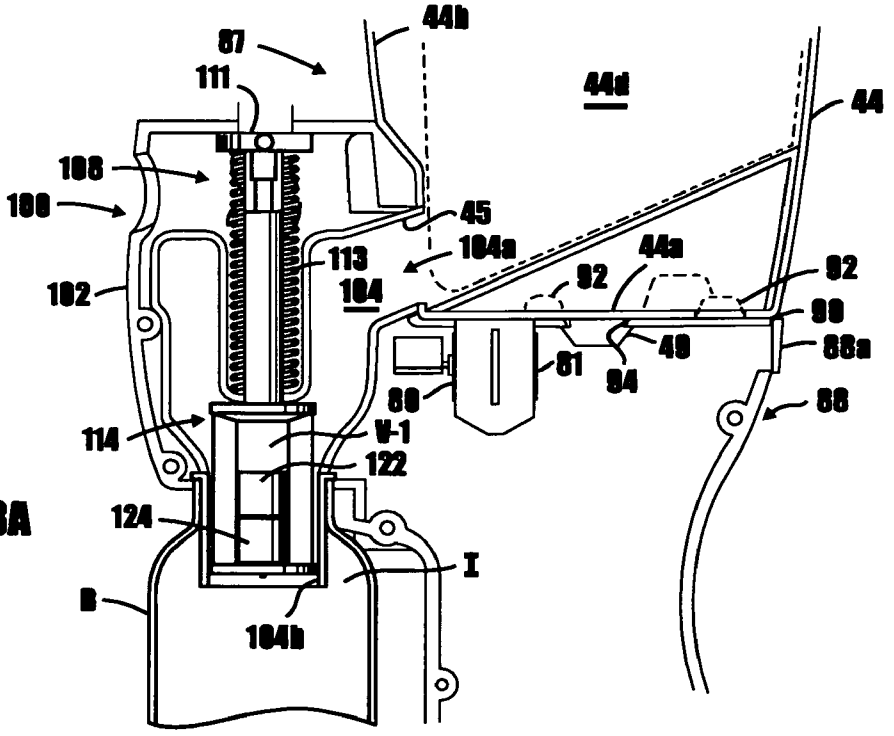

87
111
44b
44d
44
108
100
45
104a
113
104
102
44a
92
92
98
49
88a
81
94
88
88
114
V-1
122
124
I
B
104b

Fig. 8A

FORMULA DISPENSER

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable

INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC

[0003] Not Applicable

BACKGROUND OF THE INVENTION

[0004] 1. Field of the Invention

[0005] The present invention relates generally to substance dispensers. More particularly, the invention concerns an improved apparatus for dispensing metered amounts of powered material, such as infant formula, nutritional supplements and the like.

[0006] 2. Description of Related Art Including Information Disclosed Under 37 CFR 1.97 and 1.98

[0007] A wide variety of dispensers for dispensing a number of different kinds of substances have been suggested in the past. More particularly, the prior art substance dispensers include dispensers for dispensing metered amounts of particulate materials, including granular and powdered materials such as condiments, powdered flavor concentrate, chemical reagents and nutritional supplements.

[0008] By way of example, U.S. Pat. No. 5,437,396 issued to Russillo, et al., discloses a dispenser apparatus for dispensing various types of condiments including salt, pepper, tea, coffee, spices, garlic and sugar. Similarly, U.S. Pat. No. 5,259,537 issued to Beers, et al., concerns a single dosage substance dispenser for dispensing powdered chemical reagents used in photometric analysis. The Beers, et al. dispenser includes a housing having a chamber formed therein for holding the substance to be dispensed and a discharge port that communicates with the chamber. A plunger is slidably mounted to the housing for extending through the chamber and into the discharge port. A spring is provided for urging the plunger to retract so that the seal portion of the plunger engages the discharge port and a receptacle portion is maintained in the chamber to collect the single dosage therefrom.

[0009] The patent to Robbins, et al., U.S. Pat. No. 5,490,615, concerns a condiment dispenser with variable quality control. The Robbins dispenser has the plunger which is pressed downwardly by the user to dispense condiments such as salt, pepper, sugar, spices, etc. An adjusting device can be set to determine a predetermined amount be dispensed by each stroke of the plunger.

[0010] U.S. Pat. No. 7,861,749 ('749), which was issued to the present inventor illustrates and describes the earlier form of dispenser unit, the improvement of which is described in the present application. This earlier form of dispenser unit has proven to be quite satisfactory, but exhibits a drawback that the improved dispenser of the present invention has uniquely corrected. More particularly, in the operation of the earlier form of the dispenser unit, certain of the powdered materials as, for example, powdered baby formula being dispensed by the unit would occasionally tend to become overly compacted, or to clump, thereby resulting in the uneven dispensing of the material. As will be discussed more fully in the paragraphs which follow, the improved dispenser of the present invention overcomes this deficiency by providing strategically located vibration motors that tend to mitigate against clumping of the powdered materials and function, along with the plunger of the device, to mitigate against compaction of the material and to ensure smooth and uniform dispensing of the materials into the powder-receiving container.

[0011] Another significant improvement to the dispenser of the '749 Patent resides in the provision of a material-receiving container of novel operation and design that takes the place of the powdered material-containing cartridge **34** illustrated and described in the '749 Patent. The construction and operation of this novel material-receiving container will be discussed in the paragraphs that follow.

[0012] Because of the pertinence, Applicant's earlier patent, U.S. Pat. No. 7,861,749 is hereby incorporated by reference as though fully set forth herein.

[0013] While the improved dispenser of the present invention is usable for dispensing a number of different types of powdered materials, it is especially useful for dispensing powdered baby formula. In this regard, a number of different types of infant formulas are readily commercially available in the United States and throughout the world. Because it is generally less expensive, infant formula in powdered form has become quite popular in recent years. Feeding with infant formula is practiced for a number of reasons, including the inability of the mother to produce sufficient breast milk, situations where the mother is taking medication that may adversely affect the quality of her breast milk and when the mother simply chooses not to breast-feed.

[0014] Powdered infant formula is generally sold in bulk and when used is typically removed from the bulk container in measured amounts and then mixed with specified amounts of water. The exact proportions specified on the product label must be used. Under-diluted formula can result in problems with the infant's digestive system and over-diluted formula will not provide adequate nutrition for the infant. It is this problem, among others, that the apparatus of the present invention seeks to overcome by providing an easy-to-use, highly reliable dispensing apparatus that automatically dispenses into the baby bottle precise quantities of infant formula.

[0015] The unique design of the dispenser of the present invention permits the user to load into the apparatus, baby bottles of various sizes and then to accurately dispense formula into the baby bottle without spillage. The plunger of the device, which can be operated with one hand if necessary, has an oscillating action that along with the vibration motors mitigates against compaction of the formula and prevents uneven dispensing of formula. Further, the plunger action builds negative pressure internally of the dispensing chamber during the down stroke to assist with the evacuation of formula from the dispensing cartridge of the device. As the internal volume in the dispensing chamber increases during the plunger down stroke, the resulting lowered internal pressure helps to uniformly draw formula from the dispensing cartridge.

BRIEF SUMMARY OF THE INVENTION

[0016] It is an object of the present invention to provide a dispenser for dispensing metered amounts of various types of

materials, including baby formula, that is compact, easy-to-use and of an attractive design.

[0017] Another object of the invention is to provide a dispenser of the aforementioned character which can accommodate formula bottles of various sizes and in such a manner as to ensure that the formula bottle is directly integrated with the dispenser outlet so as to avoid spillage.

[0018] Another highly important object of the invention is to provide a dispenser of the character described which includes strategically located vibration motors that tend to mitigate against compaction and clumping of the powdered materials during the dispensing operation.

[0019] Another object of the invention is to provide a dispenser as described in the preceding paragraphs that includes a dispensing plunger that provides an oscillating action which, along with the vibration motor, prevents compaction of the formula and ensures even dispensing of the formula into the formula bottle.

[0020] Another object of the invention is to provide a dispenser of the character described in the preceding paragraphs in which the action of the dispensing plunger creates a negative pressure internally of the dispensing chamber of the dispenser so as to assist in the uniform withdrawal of formula from the pre-filled cartridge.

[0021] Another object of the invention is to provide a substance dispenser that dispenses powdered material, such as baby formula, from a pre-filled dispenser unit, or soft cartridge, that can be quickly and easily inserted into the material-receiving component of the dispenser.

[0022] Another object of the invention is to provide a substance dispenser of the character described in the preceding paragraph in which the pre-filled dispenser unit, or soft cartridge, can be quickly and easily opened after it has been positioned within the material-receiving component of the dispenser so as to effectively preclude contamination of the formula contained within the cartridge.

[0023] Another object of the invention is to provide a substance dispenser in which the material-receiving component of the dispenser is provided with a removable top so that, if desired, the removable top can be removed and powdered material such as baby formula from a bulk container can be quickly and easily poured, ladled or otherwise removed from the bulk container and deposited into the material-receiving component of the dispenser.

[0024] Another object of the invention is to provide a dispenser as described in the preceding paragraphs in which a single, measured portion of powdered formula is dispensed each time the dispensing plunger is actuated.

[0025] Another object of the invention is to provide a dispenser as described in the preceding paragraph that includes a volume control subassembly that enables a predetermined volume of powdered formula to be dispensed into the formula bottle.

[0026] Another object of the invention is to provide a dispenser of the type described in which the parts can be easily assembled and disassembled for ease of washing.

[0027] The foregoing and other objects of the invention are realized by the dispenser apparatus of the invention as more fully described in the paragraphs which follow.

BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWINGS

[0028] FIG. **1** is a generally perspective view of one form of the dispenser apparatus of the invention.

[0029] FIG. **2** is a generally perspective, exploded view of the apparatus shown in FIG. **1**.

[0030] FIG. **3** is a generally perspective view of one form of a material-containing cartridge usable with the dispenser apparatus of the invention.

[0031] FIG. **3**A is a generally perspective, exploded view of the material-containing cartridge shown in FIG. **3**.

[0032] FIG. **4** is a greatly enlarged, generally perspective view of the plunger sub-assembly of the apparatus of the invention.

[0033] FIG. **5** is an exploded, generally perspective, diagrammatic view, similar to FIG. **4**, illustrating the operation of the plunger sub-assembly.

[0034] FIG. **5**A is an exploded, generally perspective view, similar to FIGS. **4** and **5**, but showing the plunger sub-assembly in a material-dispensing position.

[0035] FIG. **5**B is an enlarged, cross-sectional view taken along lines **5**B-**5**B of FIG. **5**.

[0036] FIG. **6** is a view taken along lines **6**-**6** of FIG. **1**.

[0037] FIG. **7** is an enlarged, generally perspective, fragmentary view of the area designated in FIG. **6** as **7**-**7** showing in solid lines the upper portion of the dispenser housing illustrating the positioning of the vibration motors of the apparatus.

[0038] FIG. **8** is a generally perspective, exploded view of the volume control subassembly of an alternate form of dispenser apparatus of the invention for precisely controlling the volume of formula that is to be dispensed into the formula bottle.

[0039] FIG. **8**A is a fragmentary view of the alternate form of dispenser apparatus of the invention within which the volume control subassembly shown in FIG. **8** is mounted.

DETAILED DESCRIPTION OF THE INVENTION

[0040] Referring to the drawings and particularly to FIGS. **1** and **2**, one form of the improved dispenser apparatus of the present invention for dispensing powered material into a container, such as a formula bottle "B" is there shown and generally designated by the numeral **30**. The dispenser apparatus here comprises a housing **32** having a base portion **32***a* and an upper portion **32***b*. Upper portion **32***b* includes a closure wall **34** having at least one locating protuberance **35** and an opening **36**, the purpose of which will presently be described (see also FIG. **6**).

[0041] As best seen by referring to FIG. **6**, a container support base **38** is connected to housing **32** for supporting the container, or formula bottle "B". The support base is movable through a distance "D" between a first position shown by the dotted lines in FIG. **6** and a second position shown by the solid lines in FIG. **6**. Biasing means shown here as a coil spring **40** that is housed internally of housing **32**, functions to continuously urge the container support base **38** toward the first position shown by the dotted lines in FIG. **6**. In the present form of the invention, the upper end **40***a* of the spring is interconnected with the vibration motor support **41** and the lower end **40***b* of the spring is interconnected with the connector portion **38***a* of support base **38**. In operation, the support base moves telescopically along a guide rod **42** that is housed within the housing **32**. With the construction thus described, formula bottles of various sizes can readily be operably interconnected with the dispenser in the manner indicated in the drawings.

[0042] Removably connected to the upper portion **32***b* of housing **32** in the manner best seen in FIG. **6** of the drawings

is a material-receiving container **44** for receiving, in various forms, the powdered material to be dispensed. In the preferred form of the invention, container **44** comprises a bottom wall **44***a*, a side wall **44***b* having a material dispensing opening **45**, and a removable cap **44***c* that is removably connected to the upper portion of side wall **44***b*. As illustrated in FIG. **2**, after removal of cap **44***c*, a soft cartridge "SC" containing a predetermined amount of powdered material can be conveniently inserted into the internal chamber **44***d* of the container **44**. Soft cartridge "SC" is provided with a side opening "O" (FIG. **3**A) that is sealed by a sealing tab "T" that can be removed after the cartridge is in position within internal chamber **44***d*.

[0043] It is to be understood that rather than using soft cartridge "SC", the powdered material to be dispensed can be obtained from a bulk package and, once the cap **44***c* is removed, can be poured, ladled, or otherwise deposited into the internal chamber **44***d* of the container in whatever quantity that may be desired by the user.

[0044] As indicated in FIGS. **6** and **7**, to correctly position the material-receiving container **44** relative to housing **32**, bottom wall **44***a* is provided with at least one opening **44***o* that receives the previously identified protuberance **35** and a connector protuberance **49** that is constructed and arranged to be received within the previously identified opening **36** formed in the top wall **34** of housing **32**. As indicated in the drawings, when the material-receiving container **44** is correctly positioned relative to housing **32**, the outlet **45** of the container is indexedly aligned with the inlet of the novel material-dispensing assembly **54** of the invention, the character of which will presently be described. As shown in FIG. **7**, a locking plate assembly **55**, which is carried on wall **34**, releasably receives protuberance **49**. The locking plate assembly, which is similar to that described in incorporated-by-reference U.S. Pat. No. 7,861,749, is constructed and arranged so that by sliding the locking plate **55***a* of the locking plate assembly from a first position to a second release position, the protuberance **49** will be released and the material-receiving container can be separated from the housing **32** for cleaning or replacement.

[0045] Referring particularly to FIG. **6**, the important powdered material-dispensing assembly **54** here comprises a dispensing housing **56** having a powdered material chamber **57** having an inlet **57***a* that is in communication with container outlet **45**. As shown in FIG. **6**, powdered material chamber **57** has an outlet **57***b* that is in communication with the inlet "I" of the formula bottle "B".

[0046] Forming a highly novel feature of the apparatus of the present invention is a material dispensing plunger sub-assembly, which is generally designated in the drawings by the numeral **58**. Plunger sub-assembly **58**, which is interconnected with the dispensing housing **56**, comprises an elongated shaft **60** having an upper portion **60***a* and a lower portion **60***b*. By pushing downwardly on the finger engaging head portion **61**, shaft **60** can be moved within the powdered material holding chamber **58** from the first position shown by the dotted lines in FIG. **5**A to the second position shown by the solid lines in FIG. **5**A.

[0047] Affixed proximate the lower portion **60***b* of the shaft **60** is a uniquely configured, powdered material-dispensing component **64**. In a manner presently to be described, material-dispensing component **64** functions to accurately dispense metered amounts of powdered material from powdered material chamber **57** into the formula bottle "B".

[0048] Forming another highly novel feature of the present invention is oscillating means for oscillating the powdered material contained within powdered material chamber **57** as the material is dispensed into the formula bottle. This novel oscillating means functions to agitate the powdered material contained within chamber **57** and to release the powdered material from the chamber in an evenly distributed circular pattern into the formula bottle.

[0049] Referring particularly to FIGS. **4**, **5** and **5**A, this important oscillating means here comprises, in addition to shaft **60** and material dispensing component **64**, a collar **6** that is affixed to elongated shaft **60** proximate the upper portion **60***a* thereof. As best seen in FIGS. **5** and **5**A, collar **66** is provided with a pair of oppositely disposed guide pins **68** that extend outwardly therefrom. Guide pins **68** are closely received within generally serpentine-shaped guide channels **70***a* formed in a pair of oppositely disposed guide members **70** that are connected to housing **32** proximate the upper portion thereof. For a purpose presently to be described, a coil spring **72** circumscribes the intermediate portion of elongated shaft **60** so that the coil spring is disposed between collar **66** and the powdered material dispensing component **64**. With this construction, as the shaft **60** is pushed downwardly in the direction of the arrow **67** of FIG. **5** against the urging of the coil spring **72**, the guide pins **66** will travel along the serpentine guide channels **70***a* thereby causing an oscillating, generally circular-shaped motion to be imparted to the powdered material-dispensing component **64** as indicated by the arrows **69** and **71** of FIGS. **5** and **5**A.

[0050] In using the dispenser apparatus, the powdered material-containing soft cartridge SC is first inserted into chamber **44***b* of the material-receiving container **44** in the manner illustrated in FIGS. **2** and **6** of the drawings.

[0051] With the formula bottle "B" in position on the support base **38** in the manner illustrated in FIG. **6** and with the soft cartridge "SC" in position within chamber **44***b* of container **44**, the user can move the sealing tab "T" upwardly by gripping the upper margin "T−1" of the sealing tab (see FIGS. **2** and **3**A). With the sealing tab removed, the powdered medicament can flow through outlet "O", into chamber **44***b* and outwardly of opening **45** into chamber **58** of the powdered material-dispensing assembly **54**.

[0052] To dispense a predetermined amount of formula into the formula bottle, the user need only push downwardly on the palm-engaging head portion **61** of the shaft **60**. This downward movement of the shaft from the position shown by the dotted lines in FIG. **5**A to the position shown by the solid lines in FIG. **5**A will result in an oscillating movement of the powdered material-dispensing component **64** within the lower portion of chamber **57** in the manner previously described, which will cause the powdered material to flow evenly into the formula bottle.

[0053] Additionally, as previously mentioned, the downward movement of the dispensing plunger creates a negative pressure internally of the dispensing chamber of the dispenser so as to assist in the uniform withdrawal of formula from the pre-filled cartridge. More particularly, as shown in FIG. **5**B of the drawings, palm-engaging head **61** includes a passageway **61** a that communicates with a reduced diameter passageway **60***c* formed in the upper portion of shaft **60**. Passageway **60***c*, in turn, communicates with a cross-bore **60***d* formed in the upper portion of the shaft. With this construction, the downward movement of the shaft will result in a decrease in pressure which assists in drawing the powdered material from the

soft cartridge via outlet **45**. However, when the user removes his or her palm from the palm-engaging head portion, passageway **61***a* will be open to atmosphere, permitting pressure equalization to occur via the cross-bore **60***d* and the reduced diameter passageway **60***c*.

[0054] An extremely important feature of the improved dispenser of the present invention resides in the provision of first and second vibration motors **80** and **81** that are connected to the lower surface of top wall **34** of housing **32** in the manner illustrated in FIGS. **6** and **7** of the drawings. As previously mentioned, these vibration motors are strategically located proximate outlet **45** so as to impart a controlled vibration to internal chamber **44***d* of material-receiving container **44** in a manner to mitigate against compaction and clumping of the powdered materials as the materials flow through outlet **45**. While the vibration motors can take various forms, vibration motors **80** and **81** are battery-operated and are operably interconnected with a battery **84** by means of wires **80***a* and **81***a* respectively (see FIG. **6**). Battery **84**, which is of a character well understood by those skilled in the art and is readily commercially available, is disposed within the lower portion of housing **32**.

[0055] The novel and important vibration motors **80** and **81** of the present invention are of a character well understood by those skilled in the art and are readily commercially available from several sources, but vibration motors that are sold by Shenzhen Kinmore Motor Co, Ltd. of Shenzhen, Guangdong, China have proven to be quite satisfactory for the intended purpose.

[0056] After filling the bottle "B", the bottle can be removed from base **38** and the contents thereof then intermixed with water or other liquid.

[0057] When the soft cartridge "SC is empty, it can be easily removed from the container **44** and, if desired, container **40** can be disconnected from housing **32** for cleaning.

[0058] Referring next to FIGS. **8** and **8**A, an alternate form of the improved dispenser apparatus of the present invention is there shown and generally designated by the numeral **87**. This form of the improved dispenser apparatus is similar in many respects to that illustrated in FIGS. **1** through **7** and like numerals are used in FIGS. **8** and **8**A to identify like components. Unlike the earlier described embodiments of the invention, dispenser apparatus **88** includes a novel portion control assembly that can be used to dispense a precise, predetermined volume of the powdered material into a container, such as the formula bottle "B". The dispenser apparatus **87** here comprises a housing **88** that is similar in construction to the earlier described housing **32** and includes an upper portion **88***a* having a closure wall **90**. Closure wall **90** is provided with at least one locating protuberance **92** and an opening **94**, the purpose of which will presently be described. As before, housing **88** supports the container, or formula bottle "B", which, as in the earlier described embodiments, is movable between a lower position and an upper position. With this construction formula, bottles of various sizes can readily be operably interconnected with the dispenser.

[0059] Removably connected to the upper portion **88***a* of housing **88**, in the manner best seen in FIG. **8**A of the drawings, is a material-receiving container **44** for receiving the powdered material to be dispensed. Material-receiving container **44** is substantially identical in construction and operation to that previously described herein and includes a bottom wall **44***a*, a side wall **44***b* having a material dispensing opening **45**, and a removable cap (not shown in FIG. **8**A) that is removably connected to the upper portion of side wall **44***b*.

[0060] In using the apparatus of this latest form of the invention, the powdered material to be dispensed is obtained from a bulk package and, once the closure cap is removed, can be poured, ladled, or otherwise deposited into the internal chamber **44***d* of the container in whatever quantity that may be desired by the user.

[0061] To correctly position the material-receiving container **44** relative to housing **88**, bottom wall **44***a* is provided with at least one opening that receives the previously identified protuberance **35** and a connector protuberance **49** that is constructed and arranged to be received within the previously identified opening **94** formed in the top wall **90** of housing **88**. As indicated in the drawings, when the material-receiving container **44** is correctly positioned relative to housing **88**, the outlet **45** of the container is indexedly aligned with the inlet of the novel material-dispensing assembly **100** of the invention, the character of which will presently be described. As in the earlier described embodiment of the invention, a locking plate assembly releasably receives protuberance **49**. The locking plate assembly is constructed and arranged so that by sliding the locking plate of the locking plate assembly from a first position to a second release position, the protuberance **49** will be released and the material-receiving container can be separated from the housing **88** for cleaning or replacement.

[0062] Referring particularly to FIG. **8**A, the important powdered material-dispensing assembly **100** here comprises a dispensing housing **102** having a powdered material chamber **104** having an inlet **104***a* that is in communication with container outlet **45**. As shown in FIG. **8**A, powdered material holding chamber **104** has an outlet **104***b* (FIG. **8**A) that is in communication with the inlet "I" of the formula bottle "B".

[0063] Forming a highly novel feature of the apparatus of this latest form of the invention is a material-dispensing plunger sub-assembly, which is generally designated in the drawings by the numeral **108**. Plunger sub-assembly **108**, which is interconnected with the dispensing housing **102**, comprises an elongated shaft **110** having an upper portion **110***a* and a lower portion **110***b*. By pushing downwardly on the finger engaging head portion **111**, shaft **110** can be moved within the powdered material holding chamber **104** against the urging of a coil spring **113**, which circumscribes shaft **110**, from the first upper position to the second lower position.

[0064] Affixed proximate the lower portion **110***b* of the shaft **110** is a uniquely configured, powdered material-dispensing and portion control assembly **114**. In a manner presently to be described, assembly **114** functions to accurately dispense a predetermined volume of powdered material from powdered material holding chamber **104** into the formula bottle "B". Powdered material-dispensing and portion control assembly **114** includes a housing **116** having a top portion **116***a*, a threaded bottom portion **116***b* and a side portion **116***c* that interconnects the top and bottom portions. Top, bottom, and side portions **116***a*, **116***b* and **116***c* cooperate to define a generally cylindrically-shaped internal chamber **119** having a known volume "V" (FIG. **8**). Connected to top portion **116***a* is a disk-like pusher member **118** that is also connected to the bottom portion of shaft **110**. Threadably interconnected with bottom portion **116***b* of the housing **116** is a closure cap **120** that closes the lower portion of the internal chamber. Removably receivable within internal chamber **119** through an opening **119***a* is a plurality of generally cylindrically-shaped chamber volume determining inserts, each being of a known

volume. In the drawings, two chamber volume determining inserts **122** and **124** are depicted. However, it is to be understood that in using this latest form of the invention, any number of inserts of a known volume can be used.

[0065] In using the apparatus of this latest form of the invention, the user must first determine the desired portion of formula that is to be dispensed into the bottle "B". As previously mentioned, the portion of formula that is to be dispensed can be varied by varying the number of volume determining inserts that are disposed within chamber **119**. In the configuration shown in FIG. **8**A of the drawings, after removing closure cap **120**, two inserts, namely inserts **122** and **124**, have been inserted into chamber **119** through opening **119***a*. With the inserts in position within chamber **119**, the volume remaining within the chamber is the cylindrically-shaped volume identified in FIG. **8**A as "V−1". During the bottle filling operation, the formula contained within material-receiving container **44** will flow into volume "V−1" via outlet **45** and inlet **104***a* of material chamber **104**. Next, as the shaft **110** is pushed downwardly against the urging of the coil spring **113** by a force exerted on finger engaging head portion **111**, the housing **116** will be moved downwardly into the bottle and the formula contained within chamber "V−1" will flow evenly into the bottle through the circumferentially spaced apart outlets formed in the side portion of the housing.

[0066] If the user desires to dispense a larger volume of formula into the bottle, closure cover **120** can be removed and one or both of the inserts can be removed, thereby controllably varying the volume remaining within chamber **119** that can accept formula flowing from the material-receiving container **104**.

[0067] As in the earlier described embodiments of the invention, this latest embodiment includes the important first and second vibration motors **80** and **81** that are connected to the lower surface of top wall **90** of housing **88** in the manner illustrated in FIG. **8**A of the drawings.

[0068] Having now described the invention in detail in accordance with the requirements of the patent statues, those skilled in this art will have no difficulty in making changes and modifications in the individual parts or their relative assembly in order to meet specific requirements or conditions. Such changes and modifications may be made without departing from the scope and spirit of the invention, as set forth in the following claims.

1-15. (canceled)

16. An improved powder dispenser apparatus for dispensing measured quantities of powdered material, the dispenser comprising:

a chamber configured to house a quantity of powdered material therewithin, the chamber comprising an opening for permitting the user to release a measured quantity of the powdered material that may be stored within the chamber as desired;

a housing configured to support the chamber in a secure but releasable manner, permitting the user to exchange one chamber with another chamber; and

means for directing vibrational forces to the chamber, the directing means supported by the housing in a manner such that the vibrational forces facilitate the flow of powdered material from within the chamber as it is being released.

17. The improved powder dispenser of claim **13**, wherein the directing means comprises a vibration motor.

18. The improved powder dispenser of claim **13**, further comprising means for controlling measured amounts of powdered material released from the chamber when the user wishes to dispense powdered material, the controlling means comprising a plunger that defines a space having a volume into which powdered material may flow.

19. The improved powder dispenser of claim **15**, wherein the controlling means comprises an adjustment mechanism for changing the volume of the space of the controlling means.

20. The improved powder dispenser of claim **16**, wherein the adjustment mechanism comprises an insert configured to fit within a portion of the space defined by the plunger.

21. The improved powder dispenser of claim **13**, wherein the housing further comprises an adjustable support for supporting an external container, the housing configured to permit a user to transfer released powdered material from the chamber into the container by using the controlling means.

22. An improved powder dispenser apparatus for dispensing measured quantities of powdered material, the dispenser comprising:

a chamber configured to house a quantity of powdered material therewithin, the chamber comprising an opening for permitting the user to release a measured quantity of the powdered material that may be stored within the chamber as desired;

a housing configured to support the chamber in a secure but releasable manner, permitting the user to exchange one chamber with another chamber; and

means for controlling measured amounts of powdered material released from the chamber when the user wishes to dispense powdered material, the controlling means comprising a plunger that defines a space having a volume into which powdered material may flow, wherein the controlling means comprises an adjustment mechanism for changing the volume of the space of the controlling means.

23. The improved powder dispenser of claim **19**, wherein the adjustment mechanism comprises an insert configured to fit within a portion of the space defined by the plunger.

24. The improved powder dispenser of claim **13**, further comprising means for directing vibrational forces to the chamber, the directing means supported by the housing in a manner such that the vibrational forces facilitate the flow of powdered material from within the chamber as it is being released.

25. The improved powder dispenser of claim **13**, wherein the directing means comprises a vibration motor.

26. The improved powder dispenser of claim **13**, wherein the housing further comprises an adjustable support for supporting an external container, the housing configured to permit a user to transfer released powdered material from the chamber into the container by using the controlling means.

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